

Chapter 29

A CGE Analysis of the Effects of Global Climate Change Mitigation Policies on India

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ABSTRACT

This paper compares the effects of a global carbon tax and a global emissions trading regime on India using a dynamic CGE framework. The sensitivity of the results to the value of a crucial elasticity parameter is also analysed. The results suggest that the choice of the mitigation policy is relatively unimportant from an efficiency perspective. However, the choice of the mitigation policy and the value of the substitution elasticity between value added and energy were found to be important determinants of welfare effects. Global climate change mitigation policies have the potential for promoting low carbon and inclusive growth in India.

1. INTRODUCTION

The Copenhagen Accord (2009) recognises the scientific view that the increase in average global temperature should be below 2°C over the long term in order to lower the risks of catastrophic damages to the environment and the global economy. In order to restrict global warming to 2°C, major greenhouse gas (GHG) emission reductions are needed by 2050. While most of the accumulated anthropogenic atmospheric carbon dioxide can be attributed to industrialized countries, the greater share of future emissions will come from the developing world, and India and China will contribute to a substantial part of this. Thus, participation of India and China is essential for achieving global climate policy goals. In this paper we construct scenarios using a dynamic computable general equilibrium (CGE) model to analyse the economic and environmental impacts of global climate change mitigation policies (consistent with

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the 2°C objective) on India. The motivation behind the study was to analyse different frameworks for international cooperation for India in order to facilitate its engagement in a post-2012 global climate change abatement regime.

Policy makers in India have advocated the need to achieve high economic growth rates in order to eradicate poverty and to achieve human development goals (Planning Commission, 2011). However, the energy requirements for achieving high economic growth rates in a sustainable manner present a major policy challenge. At the same time there is increased pressure on developing countries like India to participate, through voluntary and nationally appropriate policies, in global climate change mitigation efforts (Planning Commission, 2011). India's position (Ministry of External Affairs, Government of India 2009) on climate change is based on the principle of common but differentiated responsibilities and respective capabilities and on the concept of equity (every citizen of the globe has equal entitlement to the planetary atmospheric resource). Further, India gives the highest priority to social and economic development even in the context of climate change, and has advocated the convergence of per capita emissions in the future. India believes that efforts to use cleaner technologies in developing economies should be facilitated by developed countries through the transfer of technology and financial resources to developing countries. Despite the daunting development challenges the country faces, India has established an elaborate framework to address climate related issues. Further, the country has imposed regulatory measures (such as tax on coal production) and has set a voluntary target (Copenhagen Pledge) to reduce the emission intensity of GDP by 20–25 per cent of the 2005 level by 2020.

Although India's per capita emissions are low relative to world standards, total emissions have been increasing rapidly in recent years due to high growth rates, and India is now the fourth largest CO₂ emitter in the world (PBL, 2012). The average global per capita GHG emissions in 2005 was 4.22 tons of CO₂-equivalent, while the corresponding figure for India was about 1.2 tons. A 2009 Ministry of Environment and Forests (MoEF) report has stated that per capita GHG emissions of India will be 2.1 tons of CO₂-equivalent in 2020, and 3.5 tons of CO₂-equivalent in 2030 (average of five studies). According to a CGE study by the National Council of Applied Economic Research (NCAER), that is part of the 2009 MoEF report, per capita emissions would be 2.77 tons of CO₂-equivalent in 2030. The report points out that per capita emissions of India are likely to remain lower than that of developed countries despite relatively high rates of economic growth.

Environmental policies have two components:

1. Identification of an overall goal (such as emission levels); and
2. Some means to achieve that goal.

There are two main methods for achieving environmental goals (Stavins, 2000): through

1. Market-based mechanisms (such as carbon tax and emissions trading); and
2. Command-and-control policies (such as explicit directives regarding pollution levels or methods of production).

Market-based mechanisms have certain advantages over traditional command-and-control approaches for achieving environmental objectives - they can help to achieve environmental objectives at the lowest possible overall cost to society by providing incentives for the greatest reductions in pollution by those firms that can achieve these reductions most cheaply. Rather than equalising pollution levels among

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